

**VIRTUAL CHAUTAUQUA  
RESEARCH AND EVALUATION REPORT**

submitted to

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The National Telecommunications and Information Administration  
Technology Opportunities Program

submitted by

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## **PROJECT OVERVIEW**

The mission of Virtual Chautauqua was to bring performing arts to isolated communities via cutting edge Internet technologies. Virtual Chautauqua focused on connecting Colorado performing artists with students and teachers in rural K-12 schools and people with disabilities. The project laid the technological foundation by teaming traditional media, community access television and radio, with new media Internet organizations. This media team created a Virtual Chautauqua Web site of performing artists juried by the Colorado Council on the Arts and incorporated digitized clips of their performances. In addition, the project developed an online database specifically designed for K-12 teachers. This database, also known as the “Performing Arts Center,” allowed teachers to select a series of clips and incorporate them with online instructions for students, as well as class electronic discussion forums. The lesson plans and activities created by one teacher were immediately available for any other teacher with Internet access. In addition, the project maintained attention to people with disabilities at all levels. One of the media partners was a radio station for the blind and reading impaired. Staff worked to incorporate Web sites and clips from performing artists with disabilities. And a small grants program also was used to address the digital divide in the general disabilities community.

## **PROJECT CONCEPTION**

The Virtual Chautauqua Project was developed in part to continue the efforts of Boulder Community Network (BCN) to facilitate the use of cutting edge Internet technology to meet community needs. BCN had been created by a TIIP funded University of Colorado at Boulder outreach grant project. BCN remained housed on the campus although it had evolved into a 501 c3 non-profit organization.

During spring 1998, I was employed by BCN as a graduate research assistant and the community network’s research and evaluation specialist. I had spent four years observing and writing about BCN outreach activities, community needs, and technology possibilities. Given this background, the BCN board of directors asked me to lay the foundation for a new community outreach project. I gathered together a planning group comprised of the director of the New Media Center on campus, a BCN board member who worked for a Web development company, and a graduate student in telecommunications who was involved at the national level with broadband communications and standards.

In 1998, streaming audio and video were gaining popularity in the commercial sector. At the same time, public media organizations had not taken advantage of the new Internet tools. A past BCN director suggested that a new outreach project should involve these technologies. Through word of mouth, a staff person from the Colorado Council on the Arts became aware of my efforts to put together partnerships for a new technology initiative. She thought, and the planning group agreed, that the streaming technologies provided a new and exciting venue for Colorado performing artists. The Council staff person joined the planning group.

The Council on the Arts served as the lead in bringing arts and education organizations to partner on the initiative. The CU-Boulder School of Journalism served as the research and technology anchor for the project. The director of the School’s New Media Center later became a co-principal investigator on the project and served as a resource on both technology and

education planning. I played the role of mapping the project based on needs and partner strengths. I wrote the proposal and signed on as a co-principal investigator. Once the project was funded, BCN took over the greater part of program administration. I maintained budget and program oversight and directed the research and evaluation of the project.

## **GRANT PARTNER ROLES AND RESPONSIBILITIES**

We labeled our partners as media, arts, education, and disabilities organizations. Several of the partners had missions that crosscut these areas. Such was the case with Young Audiences that worked to integrate arts into K-12 classrooms. Below are descriptions of the roles and responsibilities of each of the grant partners:

**AccessNet Communications** offered technical assistance on assessing Radio Reading Service of the Rockies needs. In addition, this consultant offered technical advice and assistance on the project Web site and networking.

**Arts Communication** was one of two partners with responsibility for artist Web site development. (BCN also played this role.) Arts Communication developed Web page templates and worked with the BCN director to design a project logo and home page.

**Boulder Community Network (BCN)** was responsible for the overall administration of the program. It coordinated the activities of all other grant partners and made sure the project stayed on track. In addition, BCN developed many of the artist Web sites, coordinated trainings, and drew upon its volunteer base to find technical assistants for people with disabilities who received awards from the Virtual Chautauqua project.

**Centennial Board of Cooperative Education Services (BOCES) Compensatory Education Program** was one of the links to K-12 teachers. Its central responsibility was to arrange for project staff to meet with teachers at in-service meetings and conferences. In addition, BOCES used its teacher email list to provide information to teachers about Virtual Chautauqua.

**Colorado Council on the Arts** was the lead arts organization. The Council coordinated the artist Web site awards process. They targeted performance artists who had already passed through their jury processes. It also served a central role in marketing the project to the arts community through conferences and word of mouth. CCA also provided training opportunities to artists and arts organizations. The Council had been the partner who brought other arts organizations to the table at the inception of the project.

**Colorado Rural Technology Program** was the link to rural telecommunications issues and needs. CRTP funded research on rural education telecommunications issues. In addition, the program provided expert advice to Virtual Chautauqua concerning rural telecommunication. CRTP underwent drastic budget cuts during Year 1 of the Virtual Chautauqua project and the parent agency, the Colorado Advanced Technology Institute, was folded into the State Department of Education. The result included a withdrawal of one half of the promised cash donations and staff time.

**Community Access TV of Boulder (Channel 54)** was one of three central traditional media organizations involved with the project. The central role of Channel 54 was to record, digitize and serve streaming video and audio for Virtual Chautauqua. In addition, Channel 54 assisted with marketing the project via its programming. In the last months of the project, CATV

moved to taking digitized performing artist Web content and broadcasting it via its traditional broadcast methods. The station was also able to Web cast its own programming.

**Denver Community TV** was another of three central traditional media organizations involved with the project. The central role of DCTV was to record, digitize and serve streaming video and audio for Virtual Chautauqua. In addition, DCTV assisted with marketing the project via its programming. Throughout the project, DCTV employees interviewed project staff and participants on their weekly shows. Along with CATV, DCTV became one the state's first community television stations to Web cast all its programming.

**Olshansky Consulting** served as a technical expert for the Virtual Chautauqua project. Steve assisted with grant planning, early technology information collection and decision-making. When we institutionalized an "education Web site production" course, Steve provided professional input for students on "Web project management" by preparing a guest lecture and support materials. In addition, he provided some Web site development assistance.

**Radio Reading Service of the Rockies** was the third traditional media organization involved with the project. The central role of RRSR was to record and digitize its own content. While originally intended to also serve as a streaming site, connectivity issues at the time made streaming impossible. Instead, RRSR made digitized content available to the blind and reading impaired community through a computerized phone system. In addition, RRSR transferred some digitized arts files to a central server at the University for Internet-based availability.

**Mountain View Elementary** was part of the BOCES district and was considered financially within the BOCES in-kind contribution. Yet this school's role in piloting Virtual Chautauqua was critical and stands on its own. The principal at this school had been our contact at Centennial BOCES at the project inception. During Year 1 she accepted the principal position at Mountain View Elementary and wanted to get her school involved with the project. The principal at Mountain View Elementary played a central role in putting staff in contact with her teachers. The opening of a state-of-the-art computing lab at this school allowed research staff to conduct several on-site training sessions, one-to-one working sessions with teachers, and work side-by-side with teachers as they introduced their students to Virtual Chautauqua.

**Sobel Consulting** developed the educational database for Virtual Chautauqua. This database is also known as the Performing Arts Center. In addition to creating the database, Marc Sobel also provided many hours of general technical advising and troubleshooting. He continued to work closely with the project even after the closure of the TOP grant.

**University of Colorado at Boulder** served as the fiscal agent for the grant project. The research and education outreach was coordinated through CU research staff. Faculty from the School of Journalism provided technical expertise and research direction. The University also donated funds for a central computer and secured a match from SUN Microsystems. The central server became necessary as it became apparent that a solely decentralized serving model – with given connectivity rates of the media sites – would not provide ample quality for the content being served. In addition, systems support, computer classroom time, research personnel, and adaptive technologies assistance were all provided through the University.

**Very Special Arts Colorado** served as the central disabilities and arts organization on the project. VSAC marketed and administered the small grants program for people with disabilities. It also assisted with marketing Virtual Chautauqua to artists with disabilities.

**Young Audiences** was another partner providing links to teachers, schools and artists.

Young Audiences is well known for its “Aesthetics Institute.” This program brings K-12 educators together with artists to work on integrating the arts across the curriculum. These institutes provided another forum for Virtual Chautauqua researchers and staff to discuss and demonstrate Virtual Chautauqua to teachers from across the state. In addition, Young Audiences included Virtual Chautauqua information in its statewide school mailings. Young Audiences also marketed the artist Web site awards to its school residency program participants.

## **ACTIVITY OVERVIEW**

The first year of the project was largely spent establishing the foundation for the project:

- Researching, purchasing, installing, and testing the streaming audio and video technology for the media sites.
- Soliciting the involvement of performing artists and building the arts content for the site.
- Building online tools specifically designed for teacher use of the site.
- Recruiting teachers to incorporate the site into their teaching.
- Making contacts and working with the disability communities.
- Collecting process data and documenting the activities of year one.

The second year of the project focused on:

- Adding more artists and performance clips to the Web site.
- Improving the quality of the online content and testing platforms for delivery.
- Troubleshooting ongoing technical problems with streaming audio and video.
- Developing and redeveloping strategies to involve teachers with the project.
- Continuing to work with disability communities in awarding Internet assistance grants.
- Collecting formal survey and interview data from artists, teachers and people with disabilities.
- Writing research and evaluation articles and reports.

These objectives can neatly be written in a few lines. However, the tasks and coordination involved in making them happen were immense. This report will largely focus on the processes involved in carrying out this project. It will answer key questions that may serve as guides to others who may take on a similar project: What worked and what did not work? Which goals and expectations were met or abandoned? Where and when did conflicts arise? What were the unanticipated consequences?

## **GRANT PARTNER COMMUNICATION MECHANISMS**

### **Email and Web Communication**

Email and Web communication were a staple of moving the project through its phases. The partners’ listserv, as well as a technical listserv, and other task specific mailing lists facilitated ongoing work on project needs. By the second quarter of the project, all but one of the project partner staff persons involved had email and used it to communicate about the project. The one staff person who remained without email for the entire project did so by his own choosing. It was

an interesting aberration that created communication glitches: already by the third quarter, we discontinued paper copying him even on meeting summaries. It is likely that if the partner without email had expressed any interest in receiving updates, those would have been provided. Web communication was used to present working technical plans, beta versions of Web site pieces, and some working papers. Responses to Web posting took place over email.

### **Quarterly Partner Meetings**

Partner meetings were an important mechanism for building working relationships among many very different partner organizations, sharing information, and getting smaller working group tasks accomplished. These meetings served as a grounding point between a milieu of email and Web communications that often became confusing. In an effort to be inclusive, email posts were often copied to many people and responses came from many directions.

The first of seven quarterly partners meetings was held three weeks after the project start date. The October 1998 meeting provided the first forum for all partners to meet one another. At that first meeting, one of the key outcomes was a change in the project name. Arts groups felt that the original name was too cold and technical sounding for an arts and education audience. They suggested a new name with greater appeal. So the “Public Media and the Performing Arts” project became “Virtual Chautauqua.”

Quarterly meetings became important forums for updating partners, brainstorming, coordinating decision-making, answering questions, and reprioritizing tasks for the subsequent quarter. We held the quarterly meetings at the sites of our various partner organizations. This allowed us to visit partner offices and get a feel for where people worked. In addition, as partners were spread out among several cities, changing meeting locations evened out the travel burdens. In the first year, immediately following full-group meetings, work teams would often assemble to address tasks specific to their roles in the project.

Unexpected consequences of these meetings were the development of partner alliances for purposes not directly related to the project. For example, Radio Reading Service of the Rockies aired a program in which it interviewed a Council on the Arts staff person. In addition, a technical consultant on the project became involved with operations at a local non-profit community television station.

During year two, attendance at quarterly meetings fell. Those partner organizations centrally involved in year two of the project continued to attend. Almost all the media organization contacts, with the exception of Radio Reading Services and Arts Communication, continued to participate at meetings. The education organizations were generally no longer represented. The principal of Mountain View Elementary, the contact there, could not leave her location during the normal business day when meetings were held. We scheduled an April meeting at her school so that she could come and so partners could see the project in a school. Her replacement at BOCES did not exhibit commitment to the project and did not attend meetings or initiate correspondence. The arts organizations usually continued to send representatives. The Colorado Rural Telecommunications program had been disbanded and was not involved in the project after the first half of year one.

The second to last partners meeting was held in April at Mountain View Elementary. This meeting provided a good opportunity to see Virtual Chautauqua being used in a second grade classroom. Partner organization staff expressed some surprise at how easily the children used the



site and how much they enjoyed the viewing and listening to the clips. As a part of project sustainability planning, Virtual Chautauqua partners invited staff members from the Western States Arts Federation (WESTAF) to attend the April 2000 meeting. WESTAF is a non-profit organization that maintains an online registry of Western state visual and literary artists. At the time of the April meeting, WESTAF had made plans to add in Spring 2001 performing artists to its online artist registry. We used this April meeting to open a dialogue about how WESTAF and Virtual Chautauqua might partner in the future.

The final partners meeting was held in December 2000, after the close of the federal funding from TIIAP. This forum provided partners an opportunity to bring closure to their involvement in the project. Several original partners committed to maintain involvement with Virtual Chautauqua and its offshoots in varying capacities. This closing partners meeting also allowed the CU faculty to report plans for sustaining the various aspects of the project many had helped to build.

### **Work Team Meetings**

Smaller work teams evolved around specific tasks or projects within the big project of Virtual Chautauqua. Media and technical consultants converged in a long series of online and in-person meetings discussing technical plans. The arts organizations worked together to develop plans and carry out tasks for selecting performing artists to go online. Several partner organization staff worked on developing plans for the disability awards. And a cross section of partners worked on education outreach plans.

## **LAYING THE TECHNOLOGICAL FOUNDATION**

### **Technology Research and Decision Making: Decentralized and Centralized Serving Models**

The original grant proposal laid out a decentralized model of video and audio file storage and streaming. Three media sites, two TV stations and a radio station, were to establish their own connectivity. The grant would provide them the hardware and software to digitize and serve RealAudio.

As technology consultants did the early information gathering, problems surfaced. The radio station was too far from a telephone switch to get any of the high bandwidth connections offered by the local phone service. While one of the TV stations had a T1 line running into its building, internal politics made that line unavailable in the early part of this project. (It later became available and allowed streaming). Early on, only one media site was able to secure high bandwidth connectivity.

Faced with these connectivity issues, we began to explore the possibility of securing a “mega” central server to be housed at the University. This exploration led to many communications about sharing the costs for the server between the School of Journalism and Mass Communication, Sun Microsystems, and the University administration. Agreements were made in the first year of the project for the purchase and operation of the mega server that campus computing administrators named “Lassie.”

As the central server pieces fell into place, we continued researching the technology needs for the media sites. We decided to pursue both the central server model in tandem with serving

possibilities for the media sites. Serving capability for the media sites was important because they ultimately wanted also to be able to stream their regular programming live via the Internet.

While ordering the hardware should have been straightforward, it was not. We had several technical consultants on the project with different perspectives on which platforms to use. We spent weeks discussing whether to serve using UNIX, NT or LINUX. Ultimately, we wanted the media sites to make the decision, as they would be providing the ongoing support for the systems. In addition, there was not agreement among consultants on the hardware needed. They spent hours talking and emailing with RealAudio people, as well as computer companies.

At the beginning of the 4<sup>th</sup> quarter of Year 1, equipment was installed at the sites and the video cards ordered were still incompatible with the systems. Fortunately, by the close of the 4<sup>th</sup> quarter, the technology seemed to be right. Both TV stations were digitizing performing arts clips, serving up to 25 simultaneous RealAudio streams on NT platforms, and streaming their own programming live via the Internet. The TV station with political problems secured access to the T1 line in their building. The radio station was digitizing and making their content available via a closed dial-up phone system.

### **Getting the Bugs Out: Technical Issues in Digitizing and Streaming**

Initial streaming was done on a Macintosh G3 233, running Webstar Web serving software. Most streaming techniques were prototyped on the Mac. The prototype RealVideo clips were served using the http protocol. This protocol, ideal for prototyping, allows streaming of RealVideo clips without the expense of buying and setting up a Real server. However, it limits the number of simultaneous accesses to a clip to only one access at a time.

Initial digitizing was done on a Macintosh 6500 with a standard Mac digitizing card. By the close of the 1<sup>st</sup> quarter of Year 2, video and audio clips temporarily located on the Mac server were moved to the new Virtual Chautauqua central server. This server was initially set up with the free version of Real Server, which has a 25-simultaneous access streaming capability. The server was later upgraded to handle 100 simultaneous RealAudio streams. The RealServer software uses SureStream, a technology that reads the speed of the connection that a Web surfer is using and attempts to step down the stream rate to match the speed of the connection. All clips were digitized to match connection speeds of 28.8k modems, 56k modems, and 100k or higher connections. The system administrator of the Virtual Chautauqua central server provided a report on the server installation and operations (See Appendix 1).

All streaming prototype content was developed using Macintosh computers in the School of Journalism and Mass Communication's New Media Center. A VCR was connected to the Mac 6500, and initial digitizing was performed using a shareware software program called Fusion Recorder that produces QuickTime movies. These clips then were converted to Real Audio/Video using the free version of Real Producer. Clips were standardized at 15 frames per second at 320x240 pixels.

Employees at Boulder Community Network, Community Access TV of Boulder and Denver Community TV then were trained how to digitize clips for Real streaming, using the PC equipment and software at their sites that was purchased through the grant. While people at each site were trained, they often developed their own "style" of digitizing, which occasionally caused problems of consistency. In addition, when people ran into problems with digitization, they would often communicate their problems through a technical listserv. This often resulted in a flurry of

**Table 1: Virtual Chautauqua Production and Server Technology**

|                             | <b>CU Central Server</b>   | <b>Community TV Station Servers</b> | <b>Community TV Station Production Machines</b> | <b>Radio Production &amp; Serving Machines</b>                   |
|-----------------------------|--|-------------------------------------|---|--|
| <b>Hardware</b>             | Sun Enterprise 250   | Pentium II – 350                    | Pentium II - 350                                | Pentium I I- 400   |
| <b>Operating System</b>     | UNIX   | Windows NT                          | Windows 98                                      | Windows 98   |
| <b>Software</b>             | Real Networks<br>“RealServer” 7.0  | Real Networks<br>“RealServer” 7.0   | Real Producer Plus                              | Starplus AVP<br>Voice Mail System<br>(inkind funding)            |
| <b>Capacity</b>             | Up to 100<br>simultaneous streams  | Up to 25<br>simultaneous streams    | --  | 6 port phone<br>call in/listening<br>system                      |
| <b>Other Specifications</b> | 100 gigabyte hard drive<br><br>Dual 400 Mghz<br>processors<br><br>1 gigabyte RAM | 10 gigabyte hard drive              | Osprey Video Card<br>9 gigabyte hard drive      | AGP Video Card<br>SB 64 Gold Sound<br>Card<br>8.4 gig hard drive |
| <b>Connectivity</b>         | T3   | Boulder: DSL<br>Denver: T1          | --  | 56K dial up  |

emails with everyone talking about different ways to handle the problem, resulting in no clear solutions. These problems were usually solved only by a direct visit to the site and retraining.

With the technological foundation laid, the staff was able to focus attention on the quality of the performing arts clips that were being streamed. There were several key factors that contributed to fair to poor quality clips:

1. Artists were sending poor quality recordings of performances. The recordings, some of live performances, did not have the proper lighting and framing to maximize their appeal when viewed via a RealVideo window. While they did not look or sound outstanding even when viewed with a television and VCR, they looked many times worse when viewed in a 320x240 pixel box on a computer screen.
2. Connectivity speeds were an ongoing problem. At the user end, many people were still coming in with 28.8 and 56k modems, which often do not achieve those

bandwidths. Transmissions would break up making for choppy performances that cut in and out. Initial streaming on the Mac was problematic because the Mac did not have the software to adjust stream rates to match connection speeds. Once many of the clips were moved to the central Sun server with SureStream, transmission was improved but “net congestion” messages and choppy transmissions were certainly not eliminated. The “net congestion” messages proved to have many meanings. At first it was thought that too many people were accessing the server, exceeding the initial 25-stream capability. However, such messages continued even after the software was upgraded to handle 100 streams. Connection speeds can cause the “net congestion” message. For example, if the server thinks a viewer is coming in over a 28.8k modem, it will begin streaming at that rate. However, a 28.8 modem rarely achieves or maintains that rate, which can generate the “net congestion” message. Another factor that can trigger this message is the speed of the processor on the client's machine. Some older processors (below about 233 megahertz) simply cannot handle the data rates coming in over the Web. The clips do stream well, however, with any current CPU (400 megahertz and above) over a minimum of a dedicated DSL line (256k and above). Another factor at the schools using the streaming content in computer labs was the overall load on the T1 line at the school. Over time, it was noticed that increased use of the Web at the schools caused a decline in bandwidth available for the streaming media.

3. The actual digitizing process itself contributed to the overall quality of the streaming clips. The student technical assistant responsible for digitizing clips and working with the media sites on digitizing provided a detailed report on the process (See Appendix 2).
4. Additional problems were caused when configurations were changed on the digitizing computers that were left open for use by others at the partnering organizations.

Overall, quality of content remained an ongoing problem. As indicated in the Kos technical report in Appendix 2, the quality or lack thereof in digitized performance clips had several sources. Early on, technical staff was unfamiliar with the techniques of digitizing and created poor performance clips. Yet even when these problems were overcome, the original quality of the recordings artists submitted varied, as discussed above. And finally, speed of client processors and/or bandwidth unavailability— even when running across T1 lines – contributed to digitized clips that cut in and out.

## **PERFORMING ARTISTS GO ONLINE**

### **Marketing to Artists**

Colorado Council on the Arts, Young Audiences and Very Special Arts Colorado provided the marketing support for artist outreach. The Council used direct mail and word of mouth to reach award-winning Colorado performing artists. Young Audiences used articles in newsletters and direct mail to reach performing artists who were a part of its residency program. Very Special Arts Colorado primarily used word of mouth to encourage particular artists with disabilities to participate in the project. Artists were asked to commit to corresponding with

students and answering survey and interview questions in exchange for their Web site and digitized clips.

### **Artist Selection**

The arts organizations had full control over the selection of Virtual Chautauqua Web development awardees. Early meetings had those partners coordinating with BCN the process and timelines for the selection. The initial 10 artists given Web site and digitizing awards were the latest Council fellowship recipients. Each year the Council made awards to outstanding artists in the state of Colorado. Using the current year's Council award recipients allowed us to move quickly with collecting the needed information and digitizing clips. The Council already had from these artists videotapes of original performance art. The tapes had been used to make the fellowship selections.

The arts groups made an initial selection of 30 artists. They returned to their process later in Year 1 for a second round of selections. The grant goal was to develop 50 Web sites and at least 100 performing arts clips. At the close of Year 2, Virtual Chautauqua had developed 66 Web sites and it had digitized 106 performing arts clips.

### **Collecting Artist Information and Building Sites**

The recruitment and selection of artists proved to be the easy part of the content development process. More difficult was the gathering of information for the artist Web pages. Contacting artists proved to be difficult. Staff sent overland mail questionnaires, created an online form for information gathering, and also followed up with phone calls. The process was very labor intensive.

While having several partners working on site development spread out the workload, it also created logistical problems. BCN and Arts Communication did site development. In addition, clips were digitized at the media sites by their staffs and by a student technical assistant. By the close of Year 1 Virtual Chautauqua had more than 30 artists linked to the site, but quality was suffering. There were bad links and some artist sites had fallen through the cracks.

During the 1<sup>st</sup> quarter of year two, BCN and Arts Communication met to develop a new system for coordinating the development of Web sites. They developed a database that tracked the many steps of taking an artist and his or her site through the process. Still many quality problems continued. Web designers hired contracted by Arts Communication did not have the initiative and vision to see the site as a whole and make checks and changes. In addition, serious health problems of an Arts Communication key staff person contributed to the lack of quality control. Greater burdens were placed on BCN, which was already overtaxed by project demands.

In the 2<sup>nd</sup> quarter of year two, the project research director and co-principal investigator arranged for Arts Communication to hire a subcontractor to serve as the point person on all quality checks throughout the Web site. This subcontractor was the past director of Boulder Community Network. She had coordinated the project through much of the first year. The decision to funnel this resource person to Arts Communication proved to be an invaluable investment in polishing the site for classroom use and for grant completion. Most of the ongoing quality problems were resolved in a matter of weeks. In addition, she made general changes to the site to remove time-sensitive materials that would quickly date the site when the grant closed. These changes were needed to prepare the site for a hiatus between grant closure and post-grant active artist site maintenance and growth. The post TIIAP grant activity was anticipated to begin

in January 2001 in cooperation with WESTAF and the online artists registry. Nevertheless, after the Arts Communication subcontractor completed her contract work and the site returned to the "old system" of development and maintenance, general site quality again suffered and was only aggravated when both the entire Web site and the database were moved to new servers. As the TIIAP-funded life of the Virtual Chautauqua project closed, faculty directors made plans for a complete revamping of the site.

### **Virtual Chautauqua Web Site Activity Summary**

After hovering around 400 home page visits per month for the first six months of 1999, in August, 1999, this figure began to increase significantly. The Virtual Chautauqua site surpassed 1000 visits per month in November, 1999. During December, the site received more than 2000 visits. Between the first full quarter for which data was available to the last full quarter (April 4 - July 3 to October 31 - Jan. 26) there was a 292% increase in visits to the Virtual Chautauqua site. (Note: Activity data for 2000 was lost when the site was transferred near project closing time to a new server.)

### **Training Performing Artists on Web Page Building**

Few artists participated in the training sessions offered by BCN. Web page development and basic Web surfing classes were advertised and offered to artists throughout the project. Fewer than 10 artists took advantage of this service. More artists took advantage of the walk-up training available at the Arts and Technology conference sponsored by the Colorado Council on the Arts. We do not have data on the number of artists trained in these conference forums. We do know that the training opportunities at the conference were popular. In addition, panels addressing technology and arts were well attended.

### **Artist Reactions to their Sites, Summary submitted by Mike Anderson, CU Research Assistant**

*Mike interviewed 11 artists during Summer 2000. They were a difficult group of people to contact. Arranging interviews required many phone calls, messages and emails. Eight female and three male artists participated in the interviews. Most of those interviewed lived in the Denver or Boulder area and participated in face-to-face interviews. One artist lived in Southwestern Colorado and was interviewed by phone.*

Most of the artists interviewed used the Internet for email and research. Through email they arrange gigs, talk to other artists, and organize themselves. A few use listservs, but they were in the minority. The Web helps them find out about new things – new pieces of music, new programs, new grants. All of their friends use it.

For them Virtual Chautauqua was a means of distributing their names and art to people who could not see them in person. Some were disappointed that they had not yet interacted with students. Most were in agreement that the Web is indispensable to "getting your name out there." Their ideology can be summarized thusly: it is cutting-edge, everyone is going there so it's where you want to be, and I'm ambivalent about it. They were clear that even though the Web allows more people to see your art, something is lost outside of live performance. They were not so clear, however, on what that something is. I think that they thought it was the "immediacy" of the live performance that had power, but even this was ill-defined.

Most interesting to me was that only one of the artists I interviewed mentioned the experience of being in the audience and how that can change what you are seeing. On the Web we are atomized, and I think that there is a tendency for the crystallization of views and attitudes. While I do not want to invoke the cliché of the obsessive surfer who slowly disengages himself from humanity, I expected from artists a more passionate yet cogent opinion on the power of live performance to take you somewhere – it is a temporary agreement between artist and audience in which both can dynamically affect the other in profound ways. Only Greg (the poet) proffered this view.

*Some of the artists had not seen their sites either because they were uninterested, in one case, or had not been technically able to access the information. To my surprise, the artists were generally pleased with their Web sites and the quality of their clips. Given concerns expressed by teachers about clip quality, and our internal assessment of the clips as “poor” in many cases, I was surprised that the artists were not very critical. It appears that they had low expectations and were pleasantly surprised at what they saw.*

*For more information about artists and Virtual Chautauqua see: Virnoche, Mary E. 2000. “Shakespeare Meets Bill Gates: Constructions of the Intersection of Art and Technology.” A copy of this paper is included with this report.*

## **VIRTUAL CHAUTAUQUA IN THE SCHOOLS**

### **Marketing to Teachers**

Our primary links to teachers were Centennial BOCES and Young Audiences. Mountain View Elementary was added as a partner in Year 2. BOCES and Young Audiences offered contact with dispersed populations of teachers. Yet the teacher group targeted by BOCES already had computers and were trained on the Internet. On the other hand, the Young Audiences’ teachers had already expressed interest in integrating art into their classrooms. Mountain View Elementary was a bilingual K-2 school with state-of-the-art computing facilities. It had the technology and the interest in the arts. In addition, it offered the opportunity of working with an isolated group where word of mouth would help with marketing. In addition, the principal had been involved with the project since its inception and literally and figuratively pulled teachers into participating.

BOCES put Virtual Chautauqua staff on its conference agendas. Staff presented the project and collected names of interested teachers. Then staff followed up with these teachers through one-to-one meetings. In addition, BOCES put information about Virtual Chautauqua on its teacher email list. In its region, BOCES had more than 70 teachers who had participated in an Internet project. The teachers were trained on using the Internet and each had at least one computer in the classroom. Through our BOCES contacts we involved 3 teachers with the project.

Through Young Audiences we involved few teachers. Young Audiences put staff on the agenda of its arts institutes. These were one to two week workshops focused on teachers’ integration of arts in their classrooms. At the first institute that staff attended in summer 1999,

the primary focus was to get input for the design of the education database. Young Audiences also put information in its newsletter that was sent to all the schools in the state. This newsletter information generated one contact from a principal in La Junta, Colorado. La Junta is a small, rural, Eastern Plains town. The principal was concerned about changes in the district. He anticipated threats to his arts programs and was looking to technology and other avenues to assure that his teachers and students retained access to the arts despite political battles being fought through the schools. Though he was interested in the project and we held several phone conversations, I was not able to secure a commitment from him to allow us to send staff down to his teachers.

With the start of the 1<sup>st</sup> quarter of Year 2, we only had three teachers actively working with project staff. We revisited the budget and made a pool of money available for teacher honoraria. We hoped that this would help interest teachers in at least looking at the site. We asked that in exchange for \$50, a teacher create an activity using online clips or use an already existing activity in the classroom. Then they would be required to talk to the research staff about their experience before getting the \$50. In addition, we made funds available for substitute teachers to allow regular teachers time to learn about Virtual Chautauqua and develop lesson plans.

At Mountain View Elementary we stuffed mailboxes with flyers about Internet trainings and the Virtual Chautauqua project and honoraria. In addition, the principal talked to her teachers about the project at staff meetings. Beginning in January 2000, a graduate student working with the project arranged for weekly on-site time at Mountain View Elementary. This allowed him to observe the general operations of the school, while making himself a technical resource to the teachers. We hoped his ongoing presence along with financial resources would allow us to involve a core group of teachers at that school with Virtual Chautauqua.

Between January and March, 2000, we trained 15 teachers from Mountain View Elementary on the use of Virtual Chautauqua. The first teacher to use Virtual Chautauqua received one-to-one assistance in developing her lesson. She was an art teacher with much enthusiasm for using the technology to teach art. Her positive attitude was very fortunate for us: she weathered Virtual Chautauqua through many technical problems and bugs.

On March 1, 2000, this arts teacher introduced the first groups of students to Virtual Chautauqua. Almost 50 first and second grade students during two sessions filled the seats in a state-of-art iMac lab and clicked on the performances of Virtual Chautauqua artists. Their art teacher asked them to close their eyes and think about the colors they saw when they heard a guitar piece. She also asked them to draw the shapes that appeared as ballet dancers on their computer screens performed. The children jumped up and down and laughed. They tugged on the sleeves of their classmates to get them to look at the performances that appeared on their screens. The sessions were not without problems. The server running the database crashed during the second class. Fortunately, the clips themselves resided on the central mega server and the children were able to access them without the lesson plan running on the database server. Inevitably, some of the children clicked themselves off of the site and had to be helped back. They left the Virtual Chautauqua sessions with many drawings and smiles.

The other 14 teachers from RME were trained during two 2-hour sessions in the computer lab at Mountain View Elementary. The arts teacher who had already used Virtual Chautauqua came to the sessions and showed the other K-3 teachers her online activity. The teachers had a



great time freed from the usual routine of their day. They seemed to like the opportunity to use the computers themselves and to work on new activities for their students. We asked them what types of skills they needed to work on with their students. They felt it was important for their students to just have the opportunity to work with the computers. Seventy percent of the 540 students at their pre K-2 school were from minority and low-income families. The school was also a Bilingual Literacy Center and the teachers said that their students also needed to practice the basics in listening, reading and writing. One teacher searched for performances that had "Africa" somewhere in their description or title. She was teaching a unit on Africa and wanted to include some performance art that would make the unit come alive. She found several clips including a drumming performance accompanied by a narrative from the artist.

### **Designing and Redesigning the Education Database**

The development of an education database grew out of the involvement of a partner who came to the project as it began. The original project plan involved using the online clips to write some lesson plans that could be used by teachers. The new partner suggested packaging those lesson plans and the clips within a database that would allow the teachers to create their own lesson plans online. He proceeded to pull links for all the performance clips and artist Web pages into what later became known as the "Performing Arts Center."

The general Virtual Chautauqua Web site aggregated artist Web sites and linked RealAudio clips for general use. The PAC was specifically designed for teachers and students. Teachers could select and save a collection of clips and include directions and questions for students as they watched and listened to the clips. In addition, they could incorporate notes to help other teachers and start an online discussion forum for their students. They could also copy an existing lesson plan with linked clips, tailor it to meet their own needs, and save it as a new plan or what the PAC called a "tour."

Early on we heard two dominant messages from teacher group contacts. One, teachers do not have much time. They need "ready to go" lesson plans that link directly to the standards they need to meet. The other message was that teachers did not want to be given lesson plans. They wanted to create their own activities. Along with the second message came the idea to develop a keyword search for clips. The keyword suggestion was taken with wide-eyes by the database developer given the complexity of developing such a tool.

What we found, of course, was that both types of teachers exist. Sometimes teachers who are very busy still want to create their own plans. And sometimes teachers who want to create their own plans are just too busy and are thankful for something that is ready to go. Either way, they needed a system with the database that would quickly allow them to see what the clips were all about and how they might use them. We hired a "curator" to write descriptions of each of the clips. This was a suggestion that came from teacher groups. This seemed to help teachers to make decisions about which clips to use. Still, the long list of options for clips to "choose" remained an obstacle.

*For technical documentation on the Virtual Chautauqua education database see: Sobel, Marc. 2000. "Virtual Chautauqua Educational Database Technical Documentation." A copy of this paper is included with this report. The technical documentation is also available at: <http://onestop.colorado.edu/chataqua/dataschema.htm>*

## **Initial Teacher Reactions to Virtual Chautauqua**

As we began to present the project to teachers during the 3<sup>rd</sup> and 4<sup>th</sup> quarters of Year 1, teacher reactions were generally positive. At one presentation to a group of more than 20 teachers from Northeastern rural Colorado, one drama teacher was particularly enthusiastic. She was the stereotypical teacher for whom the education piece of the project had been developed. Over the course of six years she had only taken her kids to two live performances. She was excited about the prospect of being able to have her students experience performances over the Internet. Yet she was one of the teachers whose school still did not have connectivity.

As staff members and graduate students began to meet with teachers one-to-one, they observed that teachers found working with the database fairly easy. Still, the listing of clips themselves was overwhelming. Even the most dedicated of teachers did not have time to view all the clips in search of something that might meet her needs. Teachers needed some way to quickly pick out what they needed.

In addition, teachers were concerned about the quality of the clips and the quality of connectivity. Some video clips were very dark. Some audio was muffled. “Net congestion” often meant the clips cut in and out. The teachers knew that the attention spans of their kids were limited. With these technical problems they feared (knew) that their students would quickly lose interest.

## **Hurdles in Getting Teachers Interested**

It was a challenge getting teachers to work with the project. The barriers included:

1. **Time:** Teachers were already stretched with their commitment and time available.
2. **Interest:** Not only were we talking about using new technology, we were talking about integrating art into their classrooms. For some teachers, working art into their lessons was itself a challenge.
3. **Appropriate Material:** Not all of the performances were appropriate for teaching high school, let alone elementary schools. When we began to collect artist clips, we did not direct them to send or create recordings of material only for K-12 education purposes. Later in the project, we began to collect age specific clips.
4. **Structure and Culture of Education:** The institutions do not necessarily reward teachers for being creative and trying new approaches in their classroom. In addition, teachers are always being asked to incorporate new things and more material in less time.
5. **Technology:** We knew that school technological capabilities would vary across that state. Centennial BOCES had already spent a year getting 70 teachers in Northeastern Colorado up to speed with basic Internet skills. They were in the middle of a grant program that supplied computers, Internet access and training to these teachers. We planned to piggyback on their foundation. Mountain View Elementary had state-of-the-art computing facilities. Still, several teachers at an initial meeting said that they might be interested if they knew how to use the Internet. That’s when we started to offer basic Internet training with the hope of interesting these teachers in Virtual Chautauqua. And still, little rural schools were still waiting for connectivity.
6. **Format:** The database format may not have been the best match for meeting teacher needs.

During a February 2000 meeting with the education director from the Denver Center for the Performing Arts, a very different format idea was presented. She suggested that the DCPA approach was to develop an entire unit for teachers. For example, if a teacher needed to create a plan to teach about Native Americans in Colorado, the DCPA could provide the materials for that entire unit. The DCPA felt that providing a full set of materials for an entire unit was what really helped teachers. Ironically, this type of “unit planning” for and with teachers had been the “original” project plan until a grant partner offered the opportunity for the database. Beginning Fall 2000 with new project funds, Virtual Chautauqua returned to a focus on building “units” for and with teachers via an advanced media class on the CU campus. (See Post-TIAPP Activities below)

Throughout the early part of the project we had sporadic contact with a dispersed group of teachers from Northeastern Colorado through BOCES conferences and special meetings. The critical educational contact came when the BOCES staff liaison became the principal of Mountain View Elementary in Northeastern Colorado. Because of her dedication to the project, we were able to make that school our pilot site and develop a good relationship with most of the teachers who worked there. This site offered project research faculty and graduate students a key opportunity to understand how teachers negotiated not only Virtual Chautauqua, but also many other technologies in the educational setting.

*For a detailed account of technology negotiation by K-12 teachers see: Virnoche, Mary E. and Lessem, Matt. 2000 “The ABC’s of Technology Diffusion: Colorado Elementary Teachers Getting Wired.” A copy is included with this report.*

## **OUTREACH TO THE DISABILITY COMMUNITIES**

### **Overview and Marketing of Small Grants**

The purpose of the Virtual Chautauqua small grants program was to provide software, hardware and/or training for people with disabilities who already had computers so that they could access the Internet and Virtual Chautauqua. The project budgeted \$12,000 for direct assistance technical grants for people with disabilities. Very Special Arts Colorado was the partner organization that took the lead on making connections with the disabilities communities. VSAC is an organization with a focus on making the arts accessible to people with disabilities.

During the early partner meetings, a small working group developed a plan for marketing the small grants program. The primary method of announcing the funds was to be through the VSAC quarterly newsletter. After running the announcement in a prominent position in the newsletter with little response, VSAC decided that a different approach was needed.

Still in Year 1 of the project, VSAC hired another staff assistant. This person became responsible for making organizational contacts to determine needs in the disabilities communities. Through organizations serving people with disabilities, VSAC was able to locate and assist individuals who were looking for financial assistance in meeting their computing needs. In addition, VSAC requested that a few of the grants be given to organizations such as Easter Seals for community computing resources. This approach of using other organizations to locate grant applicants and providing some grants to organizations resulted in a successful grants dissemination program.

**Table 2: Small Grants Awards to People with Disabilities**

| <b>Grant Recipient</b>                               | <b>Request</b>   | <b>Grant Award</b> |
|--|--|--------------------|
| Woman with MS  | Microsoft Intellimouse 1.0   | \$53.64            |
| Woman who was blind                                  | Window eyes upgrade; External 56K fax/modem; Speaking of the Internet Tutorial                           | \$325.93           |
| Woman with Cerebral Palsy                            | Dragon, Naturally Speaking V.3 Preferred Edition, 2 32 MB SIMM memory chip                               | \$657.50           |
| Woman with Cerebral Palsy                            | Penny and Giles Joystick plus Windows version  | \$470              |
| Women with a variety of disabilities                 | Key board, mouse, monitor and Dragon Speak   | \$602.50           |
| Woman with MS  | Pentium Computer, Dragon Speak, Internet Access  | \$1557             |
| Woman who is a quadriplegic                          | Elevating proximal mobile arm support kit, mounting bracket and relocate bracket                         | \$503.40           |
| Women who had a stroke                               | Memory upgrade to 32MB; Win Modem, CD ROM, Standard Mouse, Footprint keyboard                            | \$516.85           |
| Woman with disabilities                              | Micro Keyboard   | \$171              |
| Man who is blind                                     | Zoom Text Xtra Version 7.0 Level 2   | \$617.86           |
| Man with MS and vision troubles                      | 17 inch monitor  | \$297.65           |
| Man with visual and developmental disabilities       | Text Help Read and Write and Dragon Speak Version 4.9  | \$399.98           |
| Man who is blind                                     | Level One Zoom Text Extra Software   | \$402.50           |
| Man with Cerebral Palsy                              | Enlarged key caps, mouse track ball, forearm support, word prediction software, speech voice recognition | \$658.95           |
| Man with Macular Degenerative Disease                | Zoom Text Xtra 7.03  | \$409.44           |
| Man with physical disabilities                       | Pentium Computer   | \$1,182.53         |
| Denver Parks and Recreation Special Needs Department | Pentium 2 Voice activated system; Windows eyes upgrade   | \$950              |
| Developmental Disability Resource Center             | 3 SupperCom/Proview 19" monitor  | \$698              |
| Easter Seals   | Variety of adaptive equipment  | \$494.45           |
| Very Special Arts Colorado                           | iMac with adaptive mice and 7 port adapter   | \$1292.97          |
|  |  |                    |
| <b>Total Small Grants</b>                            |  | <b>\$12,262.15</b> |

### **Virtual Chautauqua Small Grants Program Awards**

A total of 20 Virtual Chautauqua small grants were awarded. The awards were made to seven men, nine women, and four organizations. The average small grant total was \$613. Our original proposal projected 40 awards averaging \$300 each. The adaptive technology requests that VSAC received were generally more expensive than had been anticipated. In addition,

VSAC made the case for four awards of complete computing systems. VSAC found that many people who were interested in the technology and did not already have full systems had no system at all. Most of the awards given reflect the original intention of this pool of small grant funds: to provide a small amount of added assistance to help people disabilities who already had computer technology to gain or better their access to the Internet and Virtual Chautauqua resources.

### **Small Grant Stories**

During Summer 2000, a graduate research assistant interviewed eight of the people with disabilities who received Virtual Chautauqua small grants. Most of the interviews took place in the homes of people with disabilities. Five women and three men were interviewed and also completed a survey. In several cases, the interviewer read the survey questions to the individual and recorded the answers. In one case, the primary caretaker for the individual with the disability answered the interview and survey questions for the individual with the disability.

Most of the individual award recipients were more than 40 years old. One woman was in her early twenties. All of those interviewed identified as Caucasian. All but one were comfortable using email and the Web and more than half used email every day. One woman was just learning to use the technology. More than half indicated that since receiving the grant they spent more time on email and the Web. Three quarters of those interviewed also indicated that they had 1 to 10 offline interactions because of Virtual Chautauqua.

More than half felt that they did not have adequate opportunities to see live performance. While one third of the recipients almost never saw live performance, another third saw live performances less than once a month. Almost all indicated that for them the Internet was a “good” or “very good” alternative to a live performance.

Following is a short summary of the situation of those awardees interviewed and how they use the technology in their everyday lives:

Amanda was an older woman who lived in a rural community in Colorado. Amanda was blind and heard about the small grants program through the VSAC quarterly newsletter. She received an award to purchase a windows upgrade, a modem and Speaking of the Internet tutorial (upgrade to her speech software). Below is Amanda’s story in her own words:

I was born with glaucoma. And a couple other conditions, a corneal condition where the cornea is very milky and smoky. And up until 10 years ago, I could still do some reading. Large font reading and 10 years ago I had some eye surgery to control the pressures for the glaucoma and had severe hemorrhaging which took away all the vision in my better eye. And so my worst eye has had only light perception almost all my life. And now my used-to-be-good eye only has light perception, too.

I’ve learned a lot of adaptive techniques over the years since my vision loss has been gradual all my life. In college, I used readers and recorded materials. And I found various ways to do things on my own and then when I lost almost all my vision that I had remaining about 10 years ago, then I got speech - well, not at that time - oh, I guess it was at that time. I got speech for the computer. And now I

use the computer by using speech to access everything. And with the speech, it will read what I type into the computer so I can correct mistakes and it will also read everything that's on the screen. And there's no way I can read a thing that's up there, so I have to depend totally on the speech.... I taught myself Braille and so now I read and write in Braille. Taught myself the use of the computer and Internet. I could certainly improve on all of them, but at least I'm getting by to usually get what I really need or really want.

#### Regarding Internet Use:

What I primarily do is research various topic areas. Oh, for instance, I do grant writing myself for a non-profit organization and do research for foundations to write grant proposals for. And I may do research on items that we're interested in purchasing. Just various different things I do research on.

#### But Amanda also relied on the Internet for access to some performing arts:

They would be specific performances, not the radio stations or the ongoing music channels or sites that are on there. For regular use listening, I usually play the CD or the stereo that we have here, but on the Internet it's primarily special performances and concerts.

#### Difficulties Online:

...Using the Internet and not being able to see the screen and having to depend totally on the speech - the screen reader. And then the Websites are not set up consistently that they have text labels on all of the icons, so I can't tell if I'm getting everything that's on the screen or where items are on the screen. And then there are some Web sites that the screen reader just cannot read at all because they don't have the text labels included. So some Web sites are very accessible and others are very, very inaccessible. But that's not because of my screen reader or me, it's because of the way the Web sites are defined.

Cathy was a 66 year old Irish American woman who lived in a suburb of Denver. Cathy described herself as a “fine artist.” Cathy had been living with Multiple Sclerosis for 24 years. At the time of the interview, Cathy was still waiting to be set up for Internet access. Among other things, she wanted to be able to communicate with her son in China. Cathy was not able to get out very often and did not have the financial resources to attend many live performances in the Denver area. She was looking forward to being able to use the Internet to access the arts. Cathy said:

I lost my right hand to tremors. And that was my art hand. And then I decided, okay, well we're gonna train your left hand to work and do artwork. And I knew that it took more time and motor skill to write than it took to draw. So I thought, well, I can teach that bugger to write than I could try to draw. And I have done

that. Now my hands are enough shaky, both of them, but I can show you what I do.

Jamie was a 23-year old woman who lived in the Denver area. In November of 1996, Jamie was in a car accident that left her as a quadriplegic with brain injury problems. Jamie and her mother maintained a Web site on brain injury and received about 100 emails each week from friends and strangers. Her mother and primary caretaker said:

She has no spinal cord damage, so she has full sensation from head to toe. But she damaged her brain stem, pretty much severed it, so she lost all her motor-planning skills. She - her muscles, I mean, her body has the ability to still do all these things, all the nerves and stuff. She has full voice quality and everything, but she's lost the motor-planning skills for her head to tell her body what to do.... She's lost her short-term memory though it has improved tremendously, she still has a problem with that. She's quadriplegic. She can move her left arm from the elbow down, period.

And what we got from the Chautauqua grant - the mobile arm support - what that does, it's a trunk. It's all in different hinges and stuff. That her arm will rest in and when she can move her fingers and she can stretch her elbow, but she can't like raise her arm up and do the shoulder motions. The mobile arm support does the shoulder motion for her. And it's got this big track ball mouse that you can mount, and right now she can't use it because it's like her arm is just dead weight. When she puts her fingers on the trackball, she's holding it down so hard and she can't control it so all of her weight on it. The mobile arm support supports that and holds it and she can use her fingers and operate the trackball to use the drawing programs. And she'll also be using that to do some of the Internet surfing. She can use that for some of it and the infrared that we're getting - through (another organization). This has a built-in infrared here and it'll have a connection to the computer so she can operate the computer through the infrared system. So that's what we'll be incorporating all those things together in order for her to use them.

Tim was a 42-year-old man who lived in a very small rural community in Southeastern Colorado. Tim is a computer industry retiree and is legally blind. Since he received a text enlargement software and Dragon Speak, he spends much more time online. He checks his email daily and maintains his Web pages on rare equine breeds. His grant through Virtual Chautauqua has made it more pleasurable for him to use the computer and the Internet. Tim said that he had increased the number of people he corresponds with online in any given day. For Tim, his rural location combined with his disability continued to have him looking to the Internet: "It's staying connected and staying in touch" that keeps him online.

Tim talked a little about his disability:

I've been dealing with the problem for about 20 years. But it hasn't really turned into legal blindness until last year. It sort of did a rapid decline in the past couple

of years. I'm totally blind in the left eye and in the right eye I have a restricted field of vision to less than 10 degrees. And it has quite variable cloudiness in it and the acuity, as a result, is quite variable. So, very limited and legal blindness by definition.

About how the technology makes a difference for him:

Most printed material is black printed on white page. That doesn't work well for me eye, so one of the things that that program does for me in addition to some ways that I can configure the computer is to invert it so it's a different kind of contrast. So it's printed white on black. So like you were talking to me about sending the form, I said well if you can send it to me electronically it's a lot easier. I mean, I have a video magnifier that performs that task for me, but it's just not as convenient and easy to use as if the material is on the computer. So I actually prefer to read things on the computer rather than in printed form. Which is different that it was when I was sighted. ...And in addition, I mean, for longer things where my eyes are strained if I even try to do that, I can have the computer read it to me.

Problems with Internet technology:

Especially the way some people design software programs and their Web pages. Some, like for example, people use a lot of images. You know, hard coded images that are really fine in detail and they don't present it in an alternative way. And most of the adaptive technologies I use are based on text. So they would either read it to you or they invert the images and a lot of times - or they invert the screen - and when you invert text it usually works really well, but when you invert the images they go berserk on you. They just don't look right.... And some people, you know, hard code a lot of their parameters. Like the text color has to be a certain color. Well, one somebody like me comes in and has an inverted background then it's like black text on black background.

About accessing arts online:

The downside is quality. It's definitely not as good in terms of the technology side, not necessarily the human content. The upside is the access. I mean, there's just far greater things than I'm able to access even though it is a little bit lower quality.

*For more information about people with disabilities and their use of Internet technology see: Virnoche, Mary E. 2000. "Making a Difference: Technology and People with Disabilities." A copy of this paper will be forwarded to NTIA/TOP in Spring 2001. For an analysis of survey data collected from artists, teachers and people with disabilities who participated in this project see: Virnoche, Mary E. 2000. "Virtual Chautauqua Survey Data Analysis." A copy of this paper is included with this report.*



## **POST TIAP VIRTUAL CHAUTAUQUA ACTIVITIES**

With the close of the TIAPP grant, the organization and focus of Virtual Chautauqua changed. At the writing of this report, faculty directors Henderson and Virnoche had received three grants to continue and expand aspects of the project. Their intent was to hand off the artist Web site development to a growing and successful arts Web site developer. This change would allow them to focus their own attention on integrating this content into creative K-12 educational formats and helping K-12 teachers to use the Virtual Chautauqua online technology.

### **Performing Artists Web Site Development and Maintenance**

A grant from the Colorado Council on the Arts allowed the artist Web site development to find a permanent home with the Western States Arts Federation (WESTAF). WESTAF maintained the artistsregister.com site. It seemed to be a growing and sustainable organization and a logical placement for Virtual Chautauqua artists.

At the writing of this report, the artistsregister.com site aggregated Web sites for visual and literary artists. WESTAF provided full Web site development and hosting services for a nominal fee and planned to launch streaming audio and video services in Spring 2001. These capabilities would allow them to service performing artists.

Henderson and Virnoche held a series of meetings with WESTAF staff. They arranged for the content from current Virtual Chautauqua performing artist Web sites to be transferred to the new performing artists section of the WESTAF artistsregister. Henderson and Virnoche felt confident that the Virtual Chautauqua artists would be well serviced by WESTAF and that the quality of the sites would likely improve.

Virtual Chautauqua contracted with WESTAF to redevelop and host for one year the original Virtual Chautauqua artists and new artists on the artistsregister.com site. After one year from the time the performing artist section debuts, individual artists would be responsible for renewing their contracts with WESTAF and covering hosting fees.

Critical to the contract with WESTAF, faculty directors arranged that performance clips of Virtual Chautauqua artists remain available for “direct linking” and/or “downloading” into the Virtual Chautauqua online database and educational units. At the time of this writing, faculty directors were trying to negotiate direct linking arrangements for all performing artists hosted by WESTAF. At the last meeting, faculty directors requested that WESTAF contracts include a “check box” indicating that artists would allow their performance clips to be used by Virtual Chautauqua for educational purposes without linking to the entire artist Web site. This “direct link” option was critical as linking to entire Web sites created confusion for younger students as they were directed by their teachers to listen to a certain musical or dance performance. Younger students easily get lost in a Web page searching for a performance clip link.

At the same time, faculty directors anticipate that WESTAF will maintain and grow the pool of performance art online. They felt that a growing and changing pool of quality online performance art would be critical to the educational focus of Virtual Chautauqua.

### **Outreach to Schools**

Funds from the Colorado Council on the Arts and an internal grant from the University of Colorado at Boulder will allow Henderson and Virnoche to continue outreach activities through

2001. During this time, they plan to secure additional small sums of money that will allow them to maintain contact with small numbers of K-12 teachers and slowly spread the word about Virtual Chautauqua resources.

During 2001, they will work with the University outreach office to develop a relationship with a teacher from rural Colorado who already has a commitment to working with CU outreach programs. It is unfortunate that faculty directors were unaware of these already established networks at the onset of this project. Nonetheless, a Virtual Chautauqua faculty member will make one visit to a remote area of Colorado during 2001. In addition, she will work with a small group of teachers locally and lay the plans for an undergraduate student to take over outreach activities in 2002. The focus of outreach will be on helping K-12 teachers to use the Virtual Chautauqua database and activity planning online site; and to assist them with Virtual Chautauqua online learning units (see below).

### **Educational Web Site Development Class**

Faculty director Henderson has permanently added a course to the rotation of classes in the School of Journalism and Mass Communication. This course, "Educational Web Site Theory and Production," will be offered each Fall and will help grow the educational offerings of Virtual Chautauqua. This course is part of the Technology, Arts and Media (TAM) certificate program. The TAM certificate program is a new and growing undergraduate offering at the University of Colorado at Boulder. Henderson and Virnoche received a grant from TAM to develop and team teach the course for the first time in Fall 2000.

During Fall 2000, students worked with a group of 1<sup>st</sup> grade teachers at Mountain View Elementary to develop a learning unit on Africa. Teachers reported that they were required to offer a 5-week Africa unit each year, but primarily concentrated on "animals" as they had few cultural resources. The students went to work on capturing and digitizing African performing and visual arts appropriate for 1<sup>st</sup> graders. They built an online unit complete with activity suggestions, teacher notes, and text appropriate for 1<sup>st</sup> grade reading levels. The general description of the course as it appeared in a course flyer is below:

### **Journalism 4871 or Journalism 5871 (graduate section)**

This TAM\* projects class will provide students with the experience of developing, managing and producing an online arts and education product that will be used by K-12 educators. This course will bring together skills in management, communication, fine arts, educational psychology, and journalism in a practical "real world" experience.

Students will work in project teams. Each team will be assigned a client: a K-12 teacher. Project teams will work with their assigned teacher to select a unit topic such as "19<sup>th</sup> Century Colorado History" around which a unit and learning activities will be constructed.

Student teams will incorporate online performance and visual art into their units. The units will also include text, discussion groups, unit activities, and competency quizzes. Students will develop skills in Web site planning and design, working with public media stations and/or the School of Journalism recording resources to capture performances, and skills in digitizing audio and video segments for Web streaming. The Colorado Council on the Arts and the Virtual

Chautauqua project ([www.virtualchautauqua.org](http://www.virtualchautauqua.org)) will also serve as resources for students.

*\* This course is a Technology, Arts and Media (TAM) certificate program capstone project course. It is also open to non-certificate seeking undergraduate and graduate students. For more information about the TAM program and CU-Boulder's principal campus-wide academic initiative, the Alliance for Technology, Learning, and Society (ATLAS), see <http://www.colorado.edu/ATLAS/>*

## **RECOMMENDATIONS – IF WE WERE TO DO IT OVER AGAIN**

The decentralized model for the project lent Virtual Chautauqua much of its strength. The many and diverse partners brought together communities and tools that are often worlds apart. Yet in terms of the technological management of the project, the decentralized model was detrimental to the quality of the project content.

Arts Communication was envisioned as “the” Web development contractor for the project. BCN was only to serve as back up. Arts Communication was a small and struggling Web development non-profit that targeted arts organizations. The loss of its director due to health problems was a void for both that organization and the Virtual Chautauqua project. The project’s response was to have BCN take on larger responsibilities for Web development. In retrospect, this was also a mistake. BCN operated with volunteers and its ability for diligent day-to-day monitoring of the entire Virtual Chautauqua Web site was limited. Largely due to the structure of BCN, response times to particular Web page problems were generally poor. In retrospect, the site during Year 2 of the project may have been better served by redirecting funds to a single full-time Web master and assistant responsible for all artist contact, Web page development and day-to-day maintenance and troubleshooting.

The large number of grant partners was both a project strength and a logistical challenge. In retrospect, scaling down the number of partners and the project goals may have kept us a bit saner and improved the quality of project accomplishments. Because there were so many balls in the air, each step of the process required detailed coordination. Even a fairly simple process of getting in-kind quarterly confirmations from grant partners sometimes took a great deal of time because one had to keep track of 15 different organizations – and changing organizational liaisons. This project was fortunate that “most” of the champions in each area stayed with us to the end. Yet in converging arts, media, education and disability organizations in a large project such as Virtual Chautauqua, we knew that we would face losing at least a few key players – and we did.

The involvement of highly respected arts organizations was a bonus for the project. Educators and other artists were impressed when we told them that artists on the site had been juried by the Council on the Arts and Young Audiences. Project directors acknowledge the strength of a juried site while in the same breath we are negotiating a contract with WESTAF that would leave Virtual Chautauqua’s source of performance art unjuried. We will look to WESTAF’s [artistsregister.com](http://artistsregister.com) as a central future source of performance art online that will be incorporated into Virtual Chautauqua learning units.

WESTAF’s current Web site that hosts hundreds of visual and literary artist sites is technically very high quality. The artistic value of the site content varies. Yet, given the many

problems that we had in maintaining technical quality of artist sites, we anticipate that this move will overall be positive.

It needs to be noted that Virtual Chautauqua played a technologically important role in the Colorado artist community during the TIAP grant period. Only in 2001 will another organization, WESTAF, begin to make Web sites with digitized video and audio clips available to the performing arts community. According to survey results, most of the performing artists themselves confirmed that they would not have digitized clips of their work online today if it had not been for the Virtual Chautauqua project.

Working with public television stations was an asset to the project. During the grant, both stations had redefined their roles in the community in a way that enhanced the mutually beneficial relationship between them and Virtual Chautauqua. Historically, the stations had required community members to learn how to use their technology in order to gain access to the stations' broadcast capabilities. This philosophy translated to hours of training that did not interest most community members. During the project, the stations put together technical teams of their volunteers and allowed artists to come into their studios to record performances. This new model generated more content for the stations and met the needs of Virtual Chautauqua and the community. The stations broadcast the recorded performances over their normal public television channels, as well as digitizing the content for the Virtual Chautauqua Web site. Both stations were thrilled to be able to use the same technology that helped Virtual Chautauqua to also Web cast their programming. Both stations have expressed a strong interest in continuing to provide this service to artists who are working with Virtual Chautauqua.

The single pilot school was the "right" model for this project. The original plan of working with many teachers from many different schools did not contribute to the needs of the project to work closely with teachers. Technology varied from school to school and created ongoing unknowns and teachers were difficult or impossible to contact even when they expressed interest. The single pilot school allowed us to place a graduate student in the facility on a regular basis to work with teachers on using the technology. We developed a strong relationship with teachers as well as administrators on several levels. This allowed us access to resources for not only making our project "work" in the school (i.e. approval for loading appropriate software came from the district level), but also allowed us an in-depth understanding of how technology decisions are made in the schools.

Providing substitute teachers was critical to the ability to free teacher time for working with us. Most teachers told us they probably would have participated even if we had not paid them an honorarium, but they would not have participated without the release time created by the project paying for substitute teachers.

## **APPENDIX 1**

### **CENTRAL SERVER REPORT**

Submitted by Joyce Evans, Technical Consultant

The Virtual Chautauqua video clips are served via a Real Networks media-streaming server (<http://real.com>) running on a UNIX machine (Sun Enterprise 250). At the beginning of the project, the clips ran on a free version of the RealServer (that I had not installed) that was initially capable of serving 25 streams simultaneously. A decision was made to purchase and upgrade to the 100 streams version at which point I was informed by Real Networks that I should also upgrade the actual server software to RealServer 7.0 since we were running a pretty old version of the RealServer.

The actual steps to change the licensing information to go from 25 to 100 streams (still using the old version of RealServer) were relatively easy and few in number. The challenge was in getting Real Networks to send me the new license key, which took a lot of email and phone calls between Sept. 22 1999 until Nov. 22 1999 (due in part I believe to the University-induced red tape and processing of such paperwork needed to purchase something in the price range that would require a PO). Once I received the new license, upgrading the license was a 20-minute process that involved stopping the server (done with the Web Tool for an administrator), telnet'ing into the machine and swapping out one file for another, and then restarting the server (done with the Web Tool for an administrator).

Upgrading to newest version of RealServer (version 7) was far more complicated and lacked appropriate technical documentation from Real Networks. The first attempt, which lasted for about 4 hours (including some research time to rectify problems induced by the attempted upgrade), was a failure. After a month and much email back and forth with tech support at Real Networks I was able to upgrade in another few hours. Many of the problems I experienced were due to a lack of technical documentation on the RealServer software and the automated slow support system software that Real Networks uses, which seemed to hamper the speed of a response.

Everyday maintenance of the server is minimal. The software runs flawlessly once installed and the problems that have been reported to me are 99% on the client side, not the server. My experience has been that problems experienced by the client lead the user into believing there is a problem with the server - old versions of Real Player, network congestion, and poor quality of clips.

## **APPENDIX 2**

### **DIGITIZING TECHNICAL REPORT**

Submitted by Karen Kos, University of Colorado at Boulder

Virtual Chautauqua presented the ideal proving grounds for experimentation with one of the most exciting emerging technologies of the World Wide Web: digital audio and video transmission, also known as "streaming." This breakthrough technology was developed and marketed primarily by Real Media (real.com), whose suite of digitizing-production and user interface products were fundamental to the success the Virtual Chautauqua project.

Similar to traditional broadcasting, Web-based streaming distributes video or audio-only samples (referred to hereafter as "clips") to multiple listeners and viewers from a single source: typically, a well-endowed Unix computer configured for that purpose with RealServer, Real Media's proprietary server software. Unlike traditional signal-based broadcasting, Web-based streaming utilizes "packets" of digital code that must be successfully transmitted ("streamed") over the telecommunications infrastructure to their final destination -- the computer of the user who clicked upon a link at the Virtual Chautauqua performing arts center.

To view and/or hear these performances, users must install (and continuously upgrade) what is perhaps Real Media's best known application: Real Player, a user interface that interprets and "plays" digital audio and video files on a multimedia-equipped computer. This application generates a simple control panel that pops up as a window on the user's screen, following selection (clicking) of a hypertext link to a digital recording stored on the Virtual Chautauqua server. The server receives the streaming command, the digital audio or video sample is then loaded into the user's computer, and playback begins.

This was the desired end product of a fairly straightforward but multi-stage production process in which video and audio samples supplied by the Virtual Chautauqua artists were converted, or "digitized," into Real Media-format clips. Briefly, the procedure was as follows: using a multimedia workstation wired to a VCR and audio cassette deck, the digitizing technician recorded an artist's submission into a digital file generated by a Real Media application capable of converting those analog signals into digital code to be transmitted over the data communications infrastructure. These files were encoded for streaming at three different data communications rates: 28.8 kilobits per second, 56 kilobits per second and 100 kilobits per second. The resulting data file was logged, transferred to the Virtual Chautauqua server via FTP and hypertext links, functioning as "pointers" to the server and its resident clips, were generated and logged. Throughout this process, quality tests were conducted prior to uploading of clips to the server.

That's the summary of the way things were *supposed* to work. However, as we learned throughout 1999, a number of interlinking factors can affect whether, and how well, audio/video clips play on the user's end. When problems arose, the primary suspects tended to be a lack of quality connectivity to the Internet and the amount of traffic or congestion it was experiencing at the time of the clip's selection. In other words, users with lower speed (28.8 kbps) modems and

older telephone lines will be more likely to experience delays and lower quality in clip playback – even though efforts were made to compensate for these factors. Another potential culprit was server performance: how well it is handling its volume of traffic at any given time. Still other factors include the quality of original video/audio submission and the version of RealPlayer being used, as well as various encoding and production considerations.

On many occasions the preferred solution to the various problems was to simply redigitize the clips and carefully test them prior to upload to the server. During the 4th quarter of 1999, the server software and capabilities for simultaneous streaming were upgraded. In addition, the co-principal investigator developed a syntax innovation in the hypertext links that called up the clips from the server. All of these efforts were made to improve the quality of the playback of the clips and the reliability of the digital streams.

The technical staff was not surprised to find that most of the problematic clips were video-based performances. This was obvious because digital video files contain much more data than audio-only ones; they can easily "choke" the pipeline of a 28.8 modem user whose only connection to the Web is a phone line designed to handle voice-based traffic. Without the higher-end data processing speeds (those provided by the more-expensive ISDN, cable modem or T-1 connections to the Net, for example), the streaming of digital video clips routinely involves "dropped" video frames, lost data packets and a resultant lower quality of playback.

Following server hardware, software and licensing upgrades throughout the fall and winter of 1999-2000, technical staff periodically encountered erratic clip streaming quality -- loss of video frames, resolution or video-audio track synchronization -- throughout the cohort of digital clips resident upon the Virtual Chautauqua server. In some cases the clip would not load; in others, it would load and play, but not at the optimal connection speed; in still other instances the clip would load and play, but with unacceptable frame losses and asynchronization. Staff expended much time and effort attempting to diagnose and address the source of these problems, with limited success; many afternoon hours were spent on the phone or online with one another and RealMedia's technical support staff. "Back to the drawing board" was the technical staff's motto for much of this period.

In addition, a complex configuration of hardware (including state of the art multimedia workstations), wiring and encoding software settings, as well as optimal connections to the server and the Internet, were required for the digitizing operation. The digitizing staff was required to quickly grasp a working knowledge of data communications principles and language, as well as the state of the art of telecommunications technology, in order to make educated modifications to the encoding and HTML components of the streaming product.